

MAY

20 Lansing, Michigan Bureau of Aeronautics Bldg., Capital City Airport. 8a.m.-4p.m. **Seventh Annual Aviation / Aerospace Teachers Workshop.** Registration fee is \$25.00, which includes resource materials and lunch. Capacity is limited. To register, or for additional information, please call 517-335-9977 or e-mail to krashent@mdot.state.mi.us. Sponsored by Michigan Department of Transportation, Lake Michigan Chapter of the 99's, Michigan Aeroscience Alliance, U.S. Air Force, Lansing Community College, and the Michigan Aviation Hall of Fame.

John Engler, Governor

MICHIGAN AERONAUTICS COMMISSION

Alice J. Gustafson, Chair -Pontiac
Arnold P. Saviano, ViceChair -Harbor Springs
Lowell E. Kraft, Pigeon
Robert Bender, Middleville
Fred Rakunas, Eastport

James R. DeSana, Director
Michigan Department of Transportation

Col. Michael Robinson
Michigan State Police

Brigadier General Ronald L. Seely
Michigan Department of Military Affairs

Guy Gordon
Michigan Department of Natural Resources

William E. Gehman, Director
Michigan Aeronautics Commission

Barbara Burris
Executive Assistant to the Commission

Kenneth Schaschl - Editor

MDOT Specialized Technology/Graphics - Graphic Design



FIRST ISSUE 2000

22,000 copies printed
Total cost \$5460.40
Cost per issue \$.2482



PRSRTD STD

U.S. POSTAGE

PAID

Lansing, Michigan
Permit No. 1200

OFFICIAL PUBLICATION, BUREAU OF AERONAUTICS, DEPARTMENT OF TRANSPORTATION
2700 E. Airport Service Drive Lansing, Michigan 48906-2160 Telephone: 517-335-9283

www.mdot.state.mi.us/aero/

DIRECTOR'S DESK

Continued from page 3

Improve and maintain secondary pavements so that 70 percent are rated "good" or better. These pavements include crosswind runways and taxiways. Currently, 45 airports meet this standard.

Bring three additional airports to "all-weather access" standards each year. At the present time 52 Tier 1 airports meet all-weather access standards. These standards include instrument approach procedures and weather reporting.

Appropriate zoning ordinances should be in effect at 70 percent of Tier 1 airports. Currently only 21 airports have appropriate ordinances. These are important to protect airports from urban sprawl and to insure that future land use does not pose a threat to airport safety or utility.

Navigation aids specified in the system standards should be operational at 85 percent of the airports. While existing land-based navigation aids will continue to be supported, most new airport approach procedures will be based on satellite navigation.

Precision Approach Path Indicators (PAPIs) and Runway End Identifier Lights (REILs) will be installed at 90 percent of Tier 1 airports.

MASP 2000 is the product of many months of work by MDOT Planning and Aeronautics staff members. It has been approved by both the Michigan Aeronautics Commission and the State Transportation Commission. The entire text of the document is available on the Bureau of Aeronautics website at www.mdot.state.mi.us/aero/.

MICHIGAN
Aviation



THE WILD WINDS OF WINTER

The winter season heralds the onset of blustery winds. Therefore, reviewing the procedures that are necessary to navigate safely from the tiedown, to the skies and back, is pertinent. In the northern hemisphere the jet stream moves farther south and is stronger in the colder months. This can translate into shorter takeoff rolls and improved performance. All too often, however, the wind is not aligned with the runway, making drift control an added challenge.

Continued on page 4



COMMISSION ACTION

The Michigan Aeronautics Commission met in Lansing on January 20, 2000. Among items acted upon was the approval of funds totaling \$29.2 million for airport improvements. Some projects have federal, state, and local funding, while others are funded from state and/or local sources alone. Commission approval for federally funded projects authorizes state participation, subject to issuance of a federal grant. Federal and state dollars for airport development are primarily from restricted, user generated funds. The primary sources of revenue are aviation fuel and passenger taxes, as well as aircraft registration fees.

The Following are approved projects:

ADRIAN

Lenawee County Airport - an allocation of \$1,111,111 for land acquisition to extend Runway 5/23. The proposed budget consists of \$1,000,000 federal and \$111,111 local funds.

BAY CITY

James Clements Airport - an allocation of \$34,000 to install a lighted windcone and segmented circle. The proposed budget consists of \$30,600 state and \$3,400 local funds.

CARO

Caro Municipal Airport - an allocation of \$355,000 to construct a new terminal apron and connecting taxiways. The proposed budget consists of \$319,500 federal, \$17,750 state, and \$17,750 local funds.

DETROIT

Detroit City Airport - an allocation of \$277,778 for various improvements to the terminal area.

The proposed budget consists of \$250,000 state and \$27,778 local funds.

Detroit Metropolitan Wayne County Airport - an allocation of \$18,304,000 toward an ongoing multi-year project which will ultimately include a new terminal complex and a fourth parallel runway. The proposed budget consists of \$16,640,000 federal and \$1,664,000 local funds.

ESCANABA

Delta County Airport - an allocation of \$1,700,000 to construct a parallel taxiway to Runway 18/36 and for design work on a Runway 9/27 rehabilitation project. The proposed budget consists of \$874,000 federal, \$500,000 state, and \$326,000 local funds.

FLINT

Bishop International Airport - two allocations: The first for \$350,000 to construct a new general aviation apron, consisting of \$270,000 state and \$80,000 local funds. The second for \$1,700,000 to extend Taxiway A, consisting of \$1,530,000 federal, \$85,000 state, and \$85,000 local funds.

FRANKFORT

Dow Memorial Airport - an allocation of \$360,000 to relocate a road on the north airport boundary and for approach clearing and grading. The proposed budget consists of \$324,000 state and \$36,000 local funds.

GREENVILLE

Greenville Municipal Airport - an allocation of \$410,000 to rehabilitate a portion of Runway 9/27. The proposed budget consists of \$369,000 federal, \$20,500 state, and \$20,500 local funds.

GROSSE ILE

Grosse Ile Municipal Airport - an allocation of \$1,900,000 to rehabilitate Runway 17/35 and the terminal apron. The proposed budget consists of \$1,710,000 federal, \$95,000 state, and \$95,000 local funds.

JACKSON

Jackson County-Reynolds Airport - an allocation of \$664,000 to extend Taxiway H, rehabilitate Taxiway B, and to fund a Runway 6/24 safety area study. The proposed budget consists of \$597,600 federal, \$33,200 state, and \$33,200 local funds.

MENOMINEE

Menominee-Marinette Twin County Airport - an allocation of \$250,000 for the purchase of snow removal equipment. The proposed budget consists of \$225,000 federal, \$12,500 state, and \$12,500 local funds.

OSCODA

Oscoda-Wurtsmith Airport - an allocation of \$1,040,000 to rehabilitate the ends of Runway 6/24, the terminal apron, and Taxiway D. The proposed budget consists of \$647,000 federal, \$325,000 state, and \$68,000 local funds.

PORT HURON

St. Clair County International Airport - an allocation of \$750,000 to expand the southwest apron and construct a connecting taxiway. The proposed budget consists of \$675,000 federal, \$37,500 state, and \$37,500 local funds.

Accident Reports

Accident Reports are reprinted from Federal Aviation Administration (FAA), National Transportation Safety Board (NTSB), or Police reports and are for information only. *Michigan Aviation* does not attest to the accuracy of these reports. We do not determine the cause of accidents; that is left to NTSB and FAA investigators.

SEPTEMBER

12 Linden Township, Lake Buccaneer, Pleasure flight, Injuries: serious; Aircraft damage: substantial, Wx: METAR KARB 121853Z 21011KT CLR 29/10 A2999 RMK A02 SLP150. Accident Report: Aircraft cartwheeled while landing on the water, other circumstances are unknown.

25 Grant, Stinson, Pleasure flight, Injuries: none; Aircraft damage: unknown, Wx: METAR KMKG 251755Z 17006KT 10SM CLR 21/08 A2997. Accident Report: aircraft struck power lines and made an emergency landing in a field.

27 Detroit City Airport, C150, Business flight, Injuries: serious; Aircraft damage: Destroyed, Wx: SPECI KDET 272105Z 18014KT 7SM SKC 30/14 A3001. Accident Report: Aircraft was on final for banner pick-up when the pilot pulled up because the aircraft was too low, the aircraft hooked the banner and appeared to stall, the banner was cut loose, the pilot requested to go around, and the aircraft was trying to climb when it nose-dived.

OCTOBER

10 Detroit Metro, B727, Business flight, Injuries: none; Aircraft damage: unknown, Wx: UNKN. Accident Report: Pilot declared an emergency due to a #1 engine fire warning

shortly after take-off, the aircraft returned to the airport and landed without further incident. The engine had substantial damage.

20 Benton Harbor, BE24, Pleasure flight, Injuries: none; Aircraft damage: minor, Wx: METAR KBEH 202053Z AUTO 27010KT 10SM FEW045 10/M01 A3020. Accident Report: Aircraft was landing at Niles, when the pilot realized the landing gear was retracted, the pilot aborted the landing and proceeded to Benton Harbor airport, the aircraft landed with propeller and landing gear damage.

24 St Johns, Experimental, Pleasure flight, Injuries: serious; Aircraft damage: substantial, Wx: METAR KLAN 241555Z 32010KT 10SM OVC022 03/M01 A3021 RMK SLP2. Accident Report: During touch and go landings, the aircraft encountered a strong crosswind and struck trees on the side of the runway, other circumstances are unknown.

NOVEMBER

5 Oakland Co. Int'l, LANCAIR 320, Pleasure flight, Injuries: none; Aircraft damage: minor, Wx: SPECI KPTK 051600Z 22013KT 10SM CLR 14/M01 A3007. Accident Report: Aircraft landed with the nose gear retracted.

7 Flint, C172, Pleasure flight, Injuries: none; Aircraft damage: substantial, Wx: SPECI KFNT 072359Z 19005KT 10SM CLR 03/M04 A3033. Accident Report: Aircraft landed gear up.

7 Charlotte, PA28, Training flight, Injuries: none; Aircraft damage: minor, Wx: METAR KLAN 071455Z VRB03KT

10SM FEW150 00/M04 A3048. Accident Report: Aircraft landed hard, running off the side of the runway sustaining minor damage.

12 Traverse City, C175, Pleasure flight, Injuries: unknown; Aircraft damage: unknown, Wx: METAR KIMT 122054Z AUTO 28004KT 10SM CLR 10/03 A3004. Accident Report: Aircraft departed Crystal Falls, MI, enroute to Troy, with a scheduled fuel stop at Traverse City, MI. The aircraft remains missing.

10 Detroit Metro, PA31, Air Taxi flight, Injuries: none; Aircraft damage: substantial, Wx: METAR KDTW 151654Z 33013KT 10SM SCT031 BKN240 06/M03 A3003. Accident Report: Aircraft landed gear up. The pilot/sole occupant was not injured.

DECEMBER

17 Hanover, BE35, Pleasure flight, Injuries: minor; Aircraft damage: substantial, Wx: METAR KJXN 171948Z VRB04KT 10SM BKN016 OVC060 M03/M07 A3011. Accident Report: Aircraft ran out of fuel and the pilot made an emergency landing in a swampy area.

29 Traverse City, DC-9, Air Carrier flight, Injuries: none; Aircraft damage: unknown, Wx: SPECI KTVC 291818Z 19007G16KT 150V240 3/4SM -SN VV006 01/M01. Accident Report: Aircraft, inbound on ILS, landed runway 28 and was unable to stop until just west of overrun (off pavement).



Aviation In-formation

Western Michigan University and Northwest Airlines have entered into a new partnership that includes the donation of a Boeing 747-100 to WMU's College of Aviation in Battle Creek. In a move which is believed to be the first donation of a 747 to any college or university, Northwest will help WMU use the retired airliner as a classroom/laboratory for use by maintenance and flight students. The airplane, which arrived at Battle Creek on February 4, 2000, was built in 1970 and has accumulated some 94,000 flight hours during its life. While the plane will never fly again, it will be used in all of Western's aviation programs, giving students hands-on training on aircraft systems and components still widely used throughout the world. The college has already established a working group which will develop specific plans for transforming the 747 into a laboratory and research tool.

According to WMU President Elson S. Floyd, the partnership between the university and Northwest will include maintenance internships for WMU students, as well as the development of continuing education and professional development programming for Northwest employees. Additionally, Northwest has committed to lending its name and resources to assist college recruiting efforts.

The College of Aviation has more than 600 undergraduate students enrolled in four bachelor's degree programs. Additionally, over 100 cadet pilots from British Airways, Aer Lingus, and Emirates Airlines are trained annually at the college's International Pilot Training Centre.

The Michigan Association of Airport Executives (MAAE) is accepting applications for the position of executive director. Under the direction of the MAAE board, the executive director is responsible for the fiscal and administrative activities of the association. In addition, the director will oversee all conference and training activities. The successful candidate will have considerable airport/aviation experience, an exceptional ability to communicate, the ability to travel within Michigan, and be able to provide his or her own office. Starting salary is \$20,000 to \$23,000 annually. Resumes should be sent to William C Sandifer, A.A.E., Deputy Airport Director - Operations and Maintenance, Bishop International Airport Authority, G-3425 Bristol Rd., Flint, Michigan 48507.

Michigan has a new international airport, sort of. On December 16, 1999 the old Kent County International Airport in Grand Rapids officially became the Gerald R. Ford International Airport. The Kent County Board of Commissioners voted to rename the airport in honor of Mr. Ford, a Grand Rapids native and 38th president of the United States. Ford also represented West Michigan in Congress from 1949 until 1973. The name change process will take several months to complete. A May rededication ceremony, marking the completion of an extensive terminal renovation project, will include formal recognition of the new name.

Alpena Community College is accepting applications for their "Summer Ed-Venture 2000." Among the programs to be offered is an exploration of aircraft, aviation, and space careers for young people, and an introduction to flying for adults. The youth program, which is open to students between the ages of 12 and 17, will be held June 19-23 and again from June 26-30. Participants will learn about the basics of aerodynamics, how airplanes and rockets fly, and

about careers in the aviation and aerospace industries. The program for adults is one of the college's "lifelong learner programs" for people age 50 and older. It is scheduled from June 5-9 and June 12-16. For additional information, or to register for either of these programs, contact Chris Angel, Alpena Volunteer Center Director, at 517-356-9021 Ext. 335.

Airports across the nation have recently become a little quieter. Effective January 1, 2000, stricter standards for aircraft noise went into effect. The standards were set forth by Congress in 1990 as part of the *Airport Noise and Capacity Act*. Aircraft must now meet the quieter "Stage 3" criteria by having engines which are manufactured to Stage 3 standards, by installing FAA-approved "hush kits" to quiet existing engines, or by observing certain power and flap-setting restrictions. The FAA, airlines, and manufacturers are currently working to develop even quieter Stage 4 standards.

The Aircraft Owners and Pilots Association (AOPA) Air Safety Foundation is now accepting applications for two aviation scholarships. Each will award \$1,000 annually to a college junior or senior enrolled in a curriculum leading to a degree in an aviation field. Applicants must maintain at least a 3.25 grade point average on a 4.0 scale. They must also write an essay answering the question: "What one item could be changed to improve student pilot training?" for the McAllister Scholarship. For the Burnside Scholarship, the essay should answer "How should the Air Safety Foundation educate pilots on avoiding VFR flight into instrument conditions?"

Information and applications can be obtained from the AOPA web site at www.aopa.org/asf/scholarship.html, or by sending a self-addressed, stamped envelope to Scholarship, AOPA Air Safety Foundation, 421 Aviation Way, Frederick, MD 21701.

DIRECTOR'S DESK



William E. Gehman
Director, Michigan Aeronautics Commission

MASP 2000

As we enter a new century and approach the centennial observation of powered flight, there are many reasons to be optimistic about the future of aviation. Flying is safer than ever, while passenger miles and flight hours continue to increase in all segments of the industry. New aircraft sales are increasing for the first time in nearly two decades, and the number of new pilots learning to fly is growing rapidly. In the midst of this unprecedented growth, Michigan's air transportation system is among the finest in the nation. To insure that our aviation infrastructure remains efficient and safe, the Department of Transportation has developed a tool that will guide us as we plan airport projects for the next twenty years. The *Michigan Airport System Plan (MASP 2000)* is the culmination of significant effort by a group of individuals representing diverse interests, both within and outside the aviation community.

There are presently 236 public-use airports in Michigan. Of these, 129 are publically owned and 107 are under private ownership. Each airport has been classified, according to runway size and other features, by the size of aircraft it can accommodate. Forty-one airports have facilities necessary for most business jet aircraft. An additional 86 airports have paved runways shorter than 5000 feet and can accommodate twin engine and smaller aircraft. Finally, the remaining 107 airports have turf runways, which gener-

ally limits access to single engine aircraft. By 2020 the number of based aircraft in the state is anticipated to grow by 7 percent, to 7,397, and total aircraft operations will increase by 29 percent, to 5.6 million. As one would expect, this increase in aviation activity will also increase the demand for limited federal and state airport improvement funds. *MASP 2000* has been created to help identify which airports will be prioritized for these funds.

An integral function of *MASP 2000* is to assign each airport into one of three tiers, based on its contribution to seven overall state system goals. These goals relate to the needs of business centers, tourism centers, population centers, regional capacity for based aircraft, land area coverage, and access to isolated areas. Tier 1 airports are most critical to these goals. Funding at these airports will be prioritized and will include money for expansion, as well as maintenance of current facilities. Tier 2 airports have been identified as those which complement the system goals. The focus at Tier 2 airports will be on maintaining current facilities, with a lesser emphasis on expansion. Those airports not assigned to Tier 1 or 2 are, by default, designated Tier 3. These airports duplicate services provided by other airports and/or serve the specific needs of individuals or small businesses. Limited funds will be available for preservation projects. Tier 3 airports will continue to receive wind socks, runway cones, and wire markers.

INVESTING IN THE FUTURE

Over the next twenty years, the cost to meet the goals set forth in *MASP 2000* will exceed \$2.3 billion, or \$115 million each year. If this funding continues at the historic level of \$70 million annually, the 20-year shortfall will be \$900 million. Managed investment in the development

and preservation of Michigan's airport system is essential if the system will continue to meet the needs of business and individuals. To this end, a 5-point investment strategy has been developed which assures these limited funds will be spent in the most effective manner.

1. Invest most available resources in Tier 1 airports.
2. Preserve the existing airport system infrastructure.
3. Reduce airport facility and system deficiencies by maximizing federal money returned to Michigan, leveraging local and private investments, and providing a dedicated and adequate level of state funding.
4. Distribute available funds in an appropriate mix between preservation, improvement, and expansion.
5. Emphasize meeting development standards for the *MASP 2000* system goals for business and population centers.

GOALS

Bureau of Aeronautics' staff have developed a ten-year list of preliminary goals for investing funds at the 88 Tier 1 airports. These goals are optimistically based on an airport development program funded at an annual level of \$115 million through 2010.

Reduce the number of Tier 1 airports with deficient primary runway systems by 40 percent. Presently, 55 airports have runways which have been deemed adequate in terms of length and width. A "primary runway system" is defined as an airport's main runway along with associated taxiways.

Improve and maintain primary runway system pavements so that 95 percent are rated at "good" or better. 53 airports currently meet this standard for runway and taxiway condition.

Continued on Back Cover

THE WILD WINDS OF WINTER

Continued from page 1

HOW MUCH CROSSWIND DO YOU HAVE?

Every Pilot's Operating Handbook (POH) should have a crosswind component chart. Its purpose is to calculate the component of the wind 90 degrees to the runway. The calculation of the crosswind component is simple trigonometry, but the chart allows the pilot to graphically assess the components. In practice, however, pulling out the crosswind component chart during an approach to landing

WHEN IS IT TOO MUCH?

Flight operations are most vulnerable to wind during take off and landing. Good judgement dictates that there are times when a flight should not be made—or to land at an alternate airport that has a runway more aligned with the wind.

No regulations limit flight in windy conditions. Except, perhaps, FAR 91.13—Careless or reckless operation (especially if you have an ac-

craft, although aileron effectiveness might limit some designs. As the crosswind increases, the airplane must be banked into the wind to counter drift, and opposite rudder must be applied to keep the airplane parallel with the runway centerline. The aircraft will "run out of rudder" if the rudder input is not sufficient to counteract the turning moment of the bank. Now is the time to find another runway with less crosswind!

TAXIING AND GROUND OPERATIONS

During taxi, the airplane will weathervane as the wind hits the exposed fuselage and vertical fin. (Weathervaning is most prominent in conventionally-geared aircraft and floatplanes.) Extreme wind conditions often require more power and differential braking to make turns and to maintain the taxiway centerline—especially downwind. This is another reason to decide not to go flying!

Constant vigilance of the wind direction is important when taxiing. One notable hazard is the tendency for the wind to lift a wing or the tail. This will cause the airplane to veer, nose over, or ground loop. To combat this, the pilot must position the controls so that the wind hits the top of the appropriate control surface. A memory-aid developed to help with this is "climb INTO, dive AWAY," which describes elevator and aileron positions for a quartering headwind and tailwind respectively. These control positions cause the relative wind to contact the top of the appropriate control surface, helping to hold that part of the airplane down.

When parking the aircraft, do not rely on the brakes to hold it in place. If possible, park facing into the wind. Be sure to secure the controls firmly, chock the wheels, and tie down the airplane. These precautions help to avoid a wandering aircraft.

TAKEOFF

If a crosswind component is present, start the takeoff roll with full

aileron deflection into the wind. Directional control is maintained with the rudder. As airspeed increases, reduce the aileron deflection. Consult the POH for crosswind takeoff speeds, flap settings, and recommendations for gusty conditions.

LANDING

Fifty-one percent of wind-related accidents occur during the landing phase (AOPA ASF data, 1996). Landing in high winds can be very challenging. If the wind is straight down the runway, the aircraft will require less distance to land. Unfortunately, gusts and associated wind shear are often a problem.

Touching down in a crosswind tests every pilot's skills. By flying in a slip condition, you can maintain parallel alignment with the runway centerline and keep the aircraft from

IS THE WIND REALLY A PROBLEM?

The AOPA Air Safety Foundation's Safety Review of General Aviation Weather Accidents: Analysis and Preventative Strategies published in 1996 identified 5,894 weather-related accidents over the period 1983 to 1992. Of these accidents, 48% (2,835) were wind-related and 8% (227) were fatal. March (10% of accidents), April (12%) and May (11%) were the peak months when these wind-related accidents occurred.

Here are some statistics about the pilots involved in wind-related accidents according to the AOPA ASF:

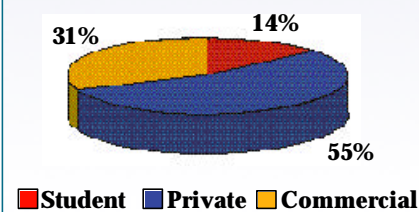
60% of pilots had fewer than 50 hours in make and model.

65% of pilots had flown within the last 24 hours.

85% had flown in the last 90 days.

31% had 100 - 500 hours of flight time.

Accidents by Certificate



is not practical. The following memory-aid may be easier to remember. If the wind is 30 degrees off the runway heading (the wind direction and runway heading are magnetic so just subtract the two) then the crosswind component will always be one-half of the total wind velocity. If the wind is 45 degrees off the runway heading, the crosswind component is slightly less than three-quarters of the total wind velocity. The significant thing to remember is that when the wind is 45 degrees off the runway, the crosswind component is not one-half of the wind velocity, but nearly three-quarters of the wind's velocity.

cident). Each pilot will form personal limitations that may change with more flight time, experience, and wisdom. The demonstrated crosswind component listed in the POH is not a limitation. It is frequently the most crosswind that was available to the company during the testing period. For many small general aviation aircraft the crosswind component is 12 to 15 knots.

The actual crosswind limit for any airplane is a result of the design and is not easily or safely determined. Rudder effectiveness is often the determining factor for most small air-

The top ten ways people got into trouble with the wind

(1983 - 1992 AOPA ASF).

1. General loss of control landing in gusts/crosswind/tailwind	804 (28%)
2. Specifically crosswind landings	183 (6%)
3. Landed long due to downwind landing	109 (4%)
4. Taxiing in unfavorable winds	104 (4%)
5. Hard landing due to gusts, crosswind	93 (3%)
6. Loss of directional control during takeoff in gusts, crosswind	66 (2%)
7. Attempted takeoff in high gusts/wind resulting in loss of control	65 (2%)
8. Attempted downwind takeoff and delayed abort	65 (2%)
9. Delayed go around	54 (2%)
10. Landed short of runway due to gusts, downdrafts, shear, crosswind	46 (1.6%)

drifting. Use the rudder to control the aircraft's heading, the ailerons to control drift, and touch down on the upwind wheel first. After touchdown, many pilots feel relieved and take out all of their wind correction. Remember to maintain the appropriate wind correction inputs until the airplane is tied down!

TWO SCHOOLS OF THOUGHT

Positioning an aircraft to land in a strong crosswind requires one of two techniques. These are the "crab and kick" and the "slip." With the "crab and kick" you crab into the wind on final, and before the flare, kick in just enough rudder to point the nose down the runway. You must also lower the upwind wing to counter drift. Most airliners use this technique.

The slip technique is established farther out on final and may not require as much finesse during the flare as the crab and kick. Using the "slip" requires you to keep the nose pointed straight down the extended centerline and control drift with ailerons all the way to the touchdown.

The technique I prefer in strong crosswinds is a combination of the two. I fly the last part of the approach crabbed into the wind with the wing lowered halfway between the crab and a slip. Consequently, the transition to a slip during the flare is not as drastic.

Arguments abound for and against each technique. Either is acceptable, providing you maintain a safe airspeed,

land ON the centerline and traveling the same direction as the runway.

NO DRIFTING!

In a gusty crosswind, a tricycle gear aircraft should touch down in a less nose-high attitude than normal. Resist the temptation to force the aircraft onto the ground. If the aircraft is too fast, it will bounce back into the air without the proper bank angle or fuselage orientation. The result is an E-ticket ride off the side of the runway. When landing in a gusty crosswind, ALWAYS be ready to go around before things get nasty.

When can you expect low-level wind shear? If the wind is blowing hard and gusting, a certain amount of shear is always present. Some of the most common conditions causing wind shear are strong and gusty surface winds, frontal passages, thunderstorms, gust fronts, and orographic effects (winds channeled by local terrain can behave erratically). Always check with the Flight Service Station for changing weather conditions, and to obtain current pilot reports.

Remember that old adage: "Keep flying the airplane until it is tied down." And let's be careful out there!

Debbie Wilson is a CFI with single-engine land and sea, and multi-engine land ratings. She loves to fly tail draggers and tows banners for fun. Ms Wilson is the Alternate Chief Check Pilot for the Civil Air Patrol. She flies out of Lansing, Mason, Battle Creek, and Toledo Suburban airports.